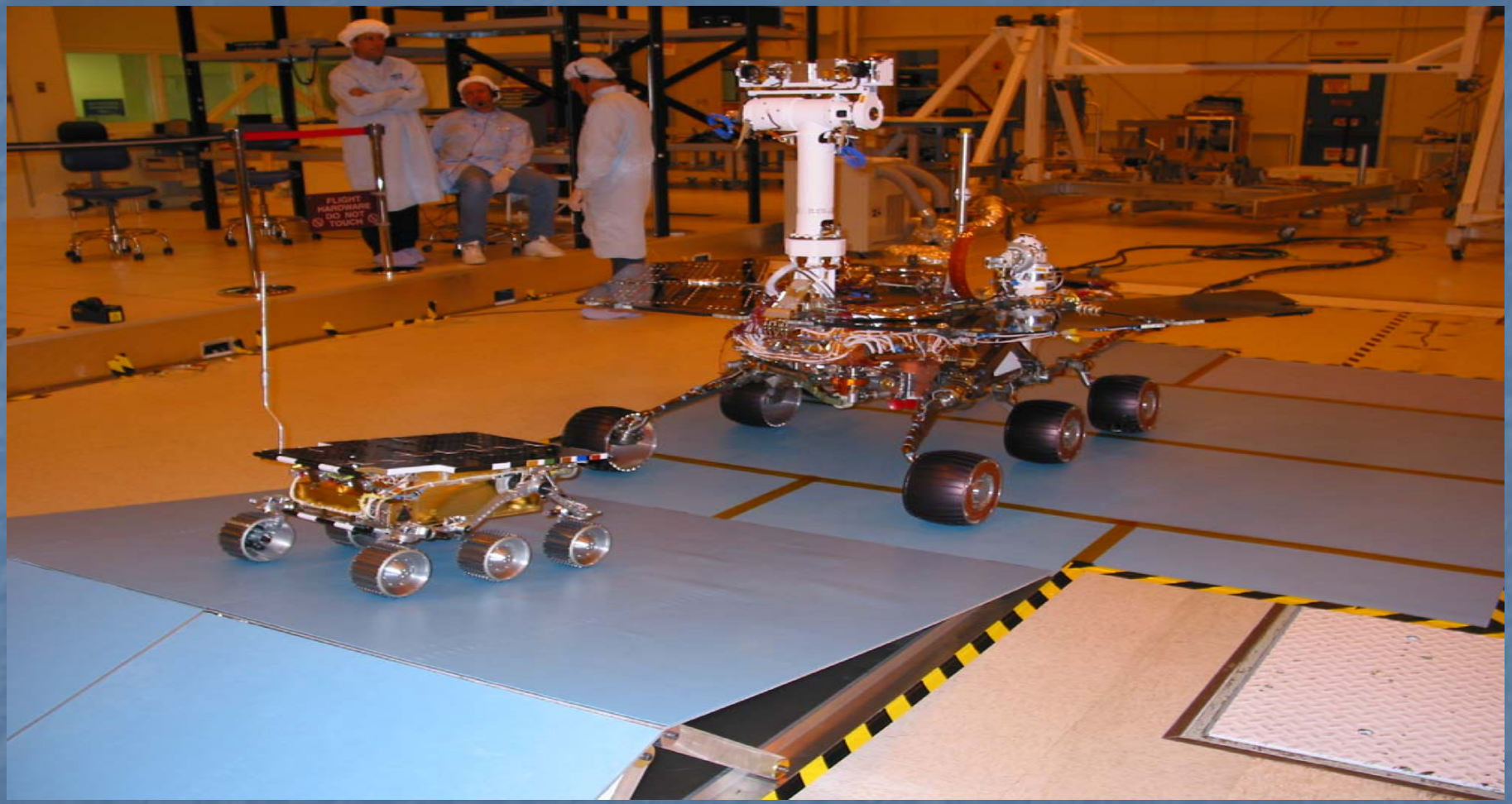
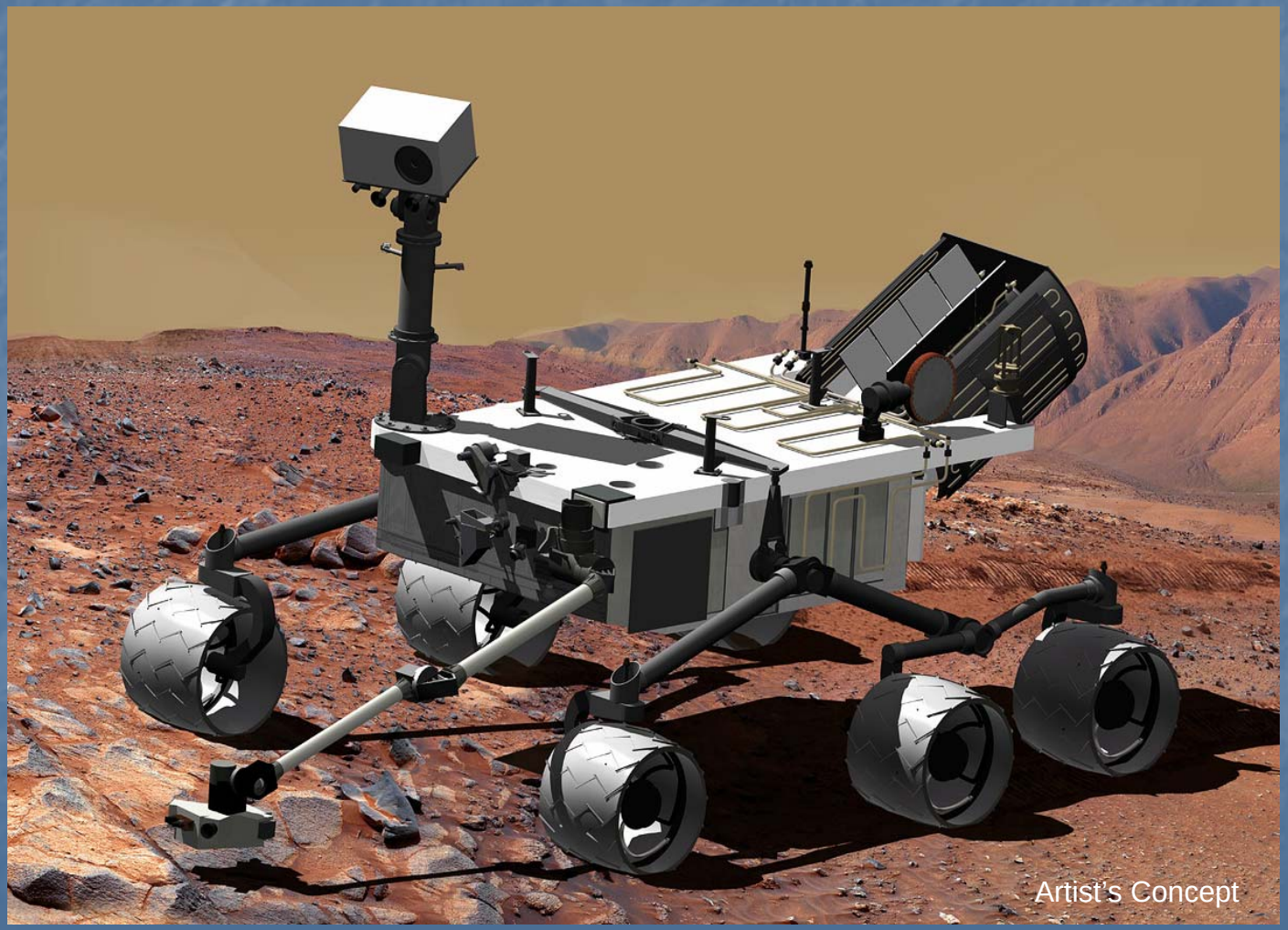
FIRST PATHFINDER THEN MER



NOW MARS SCIENCE LABORATORY



Mission Overview

- Its mission: investigate the past or present potential of Mars to support microbial life.

  Plans for the Mars Science Laboratory call for launch from Cape Canaveral Air Force Station, Florida, In September or October 2009 and arrival at Mars in summer 2010.

Research Objective

The science goal is to assess whether the landing area ever had or still has environmental conditions favorable to microbial life.

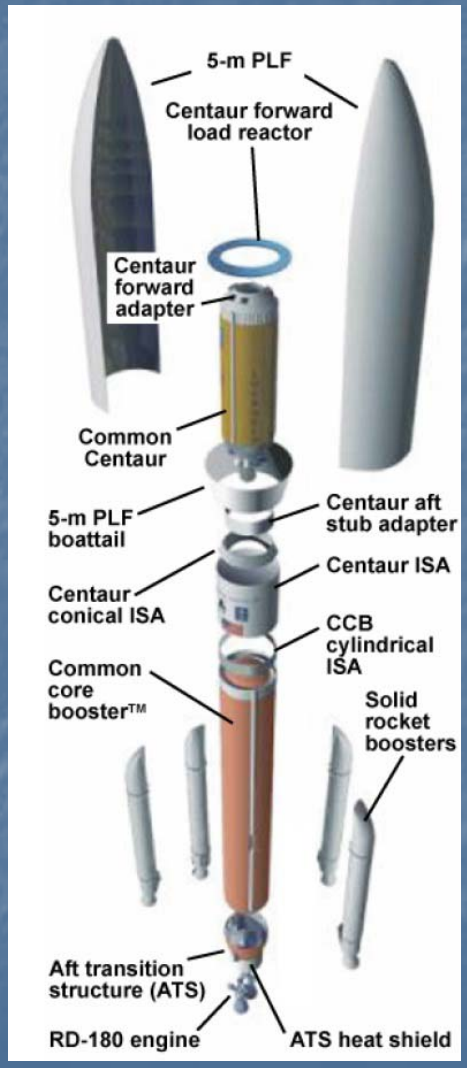
Investigations to support this objective

- Detecting and identifying any organic carbon compounds
- Making an inventory of the key building blocks of life
- Identifying features that may represent effects of biological processes
- Assessing how Mars' atmosphere ahs changed over billions of years
- Determining current distribution and cycles of water and carbon dioxide

Science Payload

- Gas chromatograph
- Mass Spectrometer
- Laser Spectrometer
- X-Ray Diffraction and Fluroescence
- Alpha Particle X-Ray Spectrometer
- Radiation Assessment Detector
- Environmental Monitoring Station
- Dynamic Albedo of Neutrons Instrument

Atlas V 541 Launch Vehicle



MSL Cruise Stage w/Spacecraft

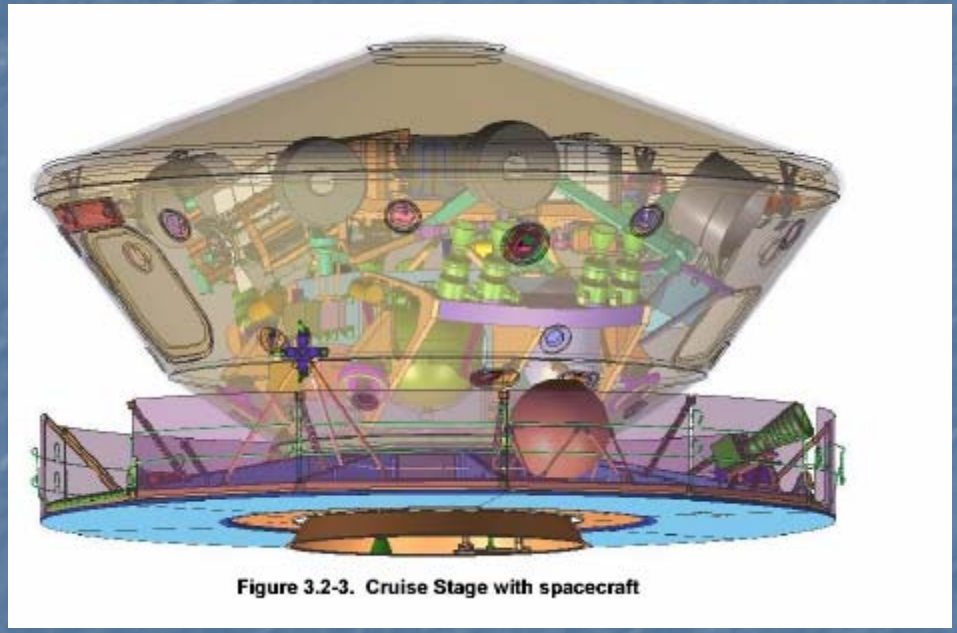


Figure 3.2-3. Cruise Stage with spacecraft

MSL Spacecraft

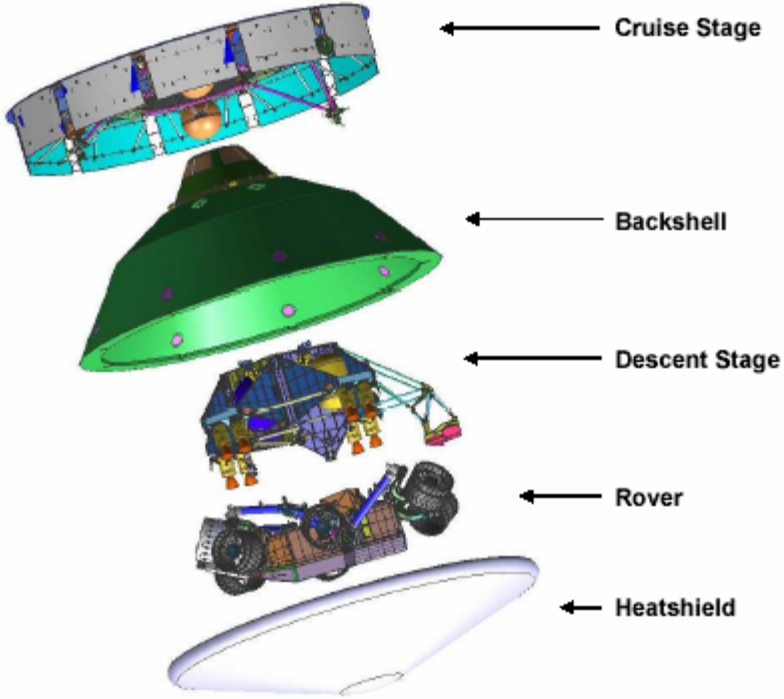


Figure 3.2-1. MSL Spacecraft, Expanded View of Elements

MSL Rover

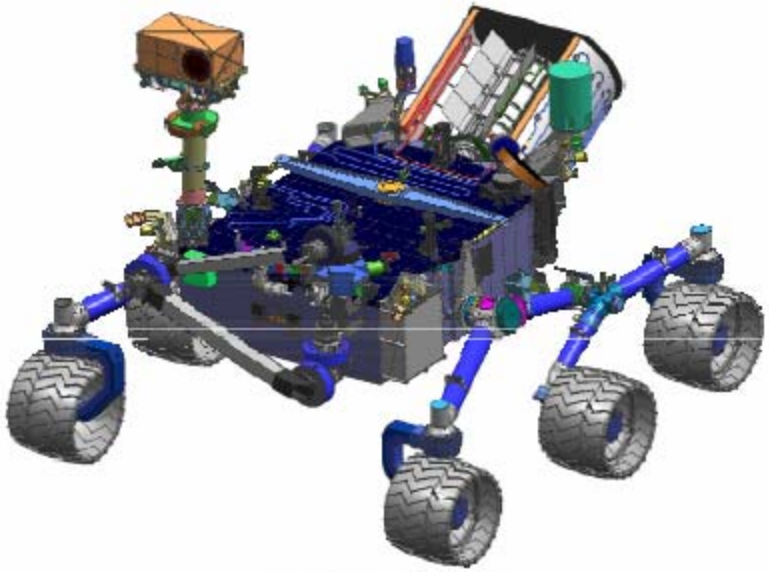
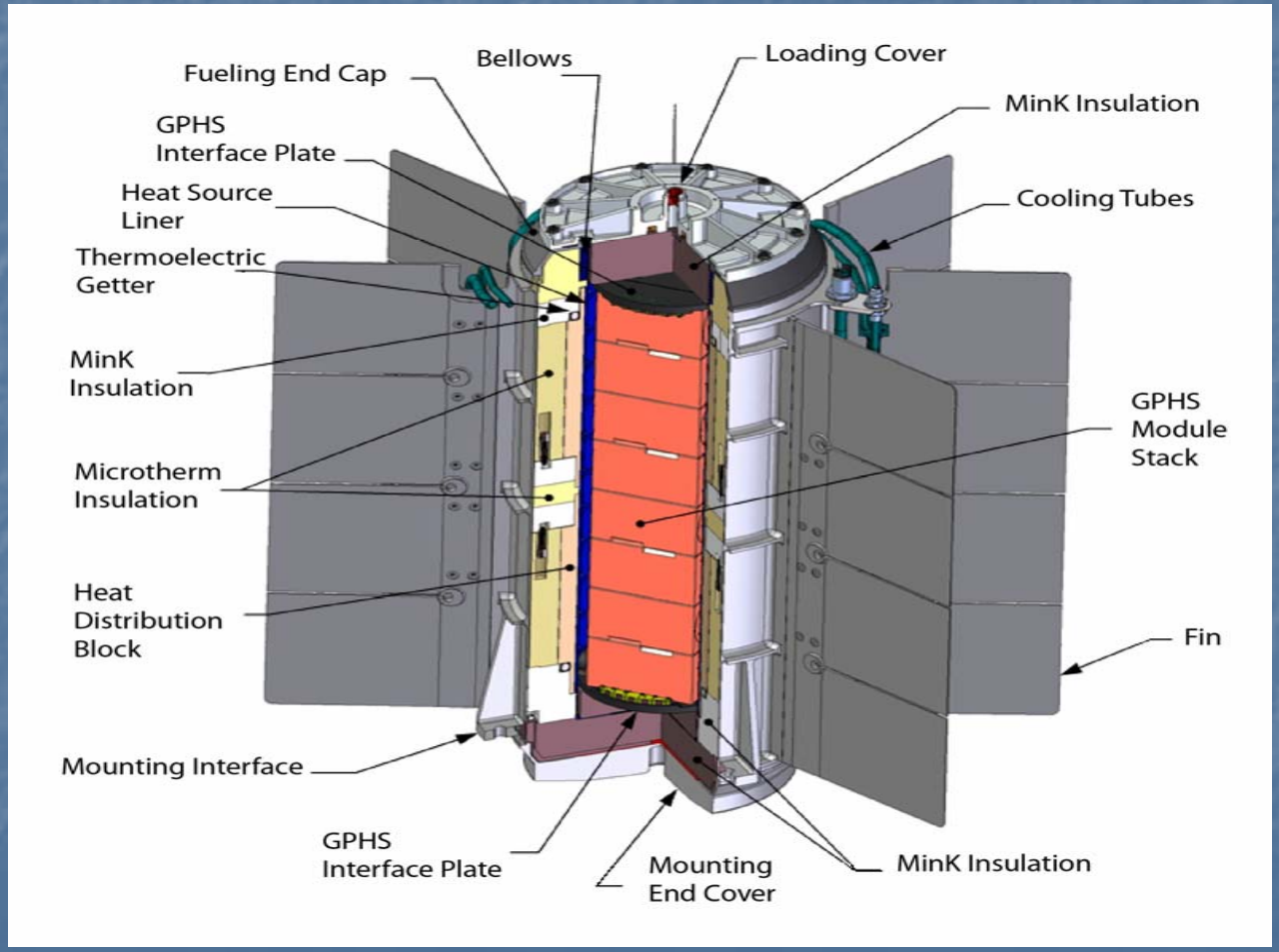


Figure 3.2-9. MSL Rover

History of RTG'S In Space

- Two types of Radioisotope Systems
  - Power generators (10's to 100's of Watts) and Heater units (1 Watt thermal)
- Long history of use in space
  - First launch in 1961
  - Used safely and reliably in missions for 40 years
    - 6 on the Moon (1960s - 1970s)
    - 8 in Earth orbit (1960s - 1970s)
    - 5 on Mars (1970s & RHUs 1996/2003)
    - 8 to outer planets and the Sun (1970s - 2006s

Multi-Mission Radioisotope Thermoelectric Generator



MMRTG

1900 Watt thermal MMRTG
100 Watt electrical
8 GPHS Modules
4800 g PuO_2
60,000 Ci

General Purpose Heat Source-Step 2

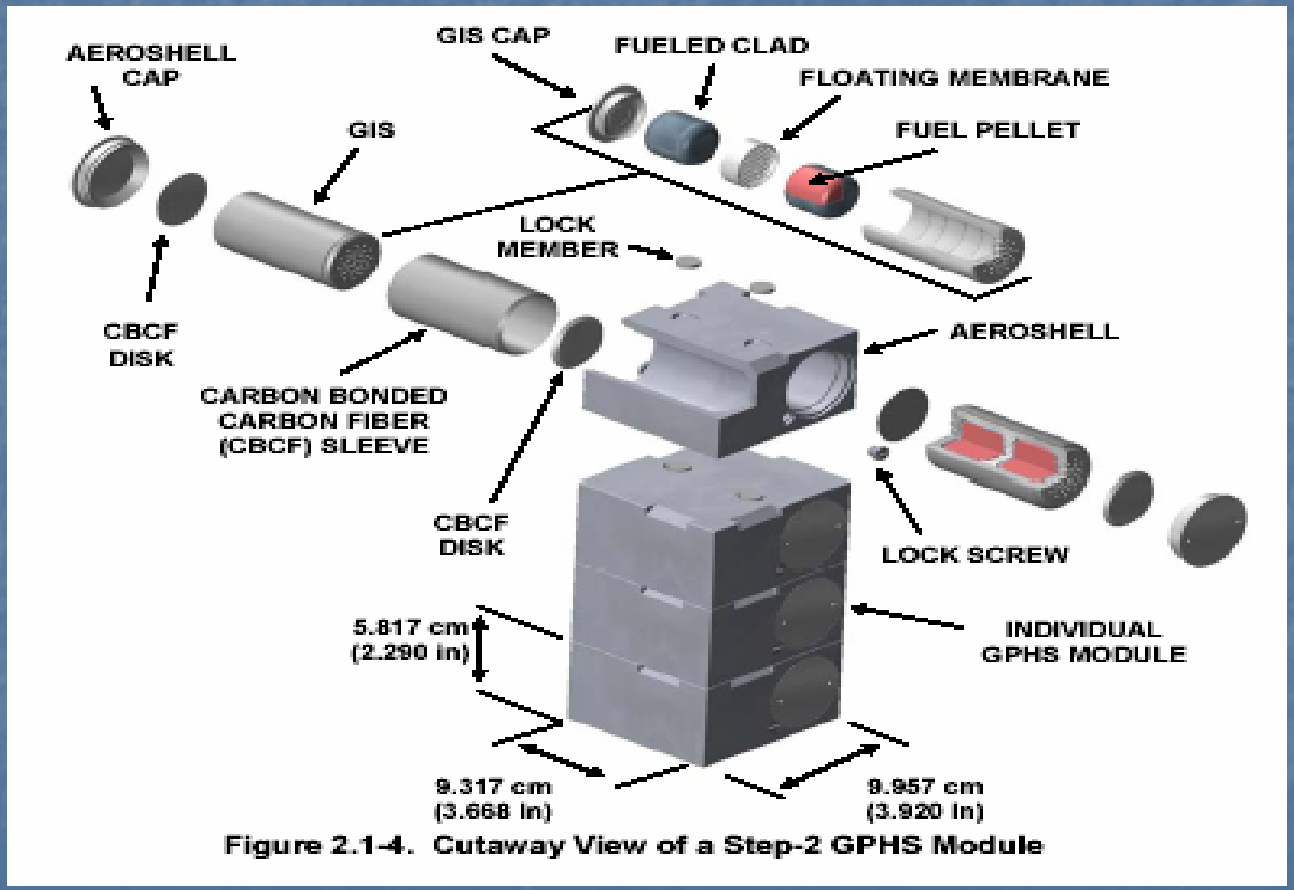
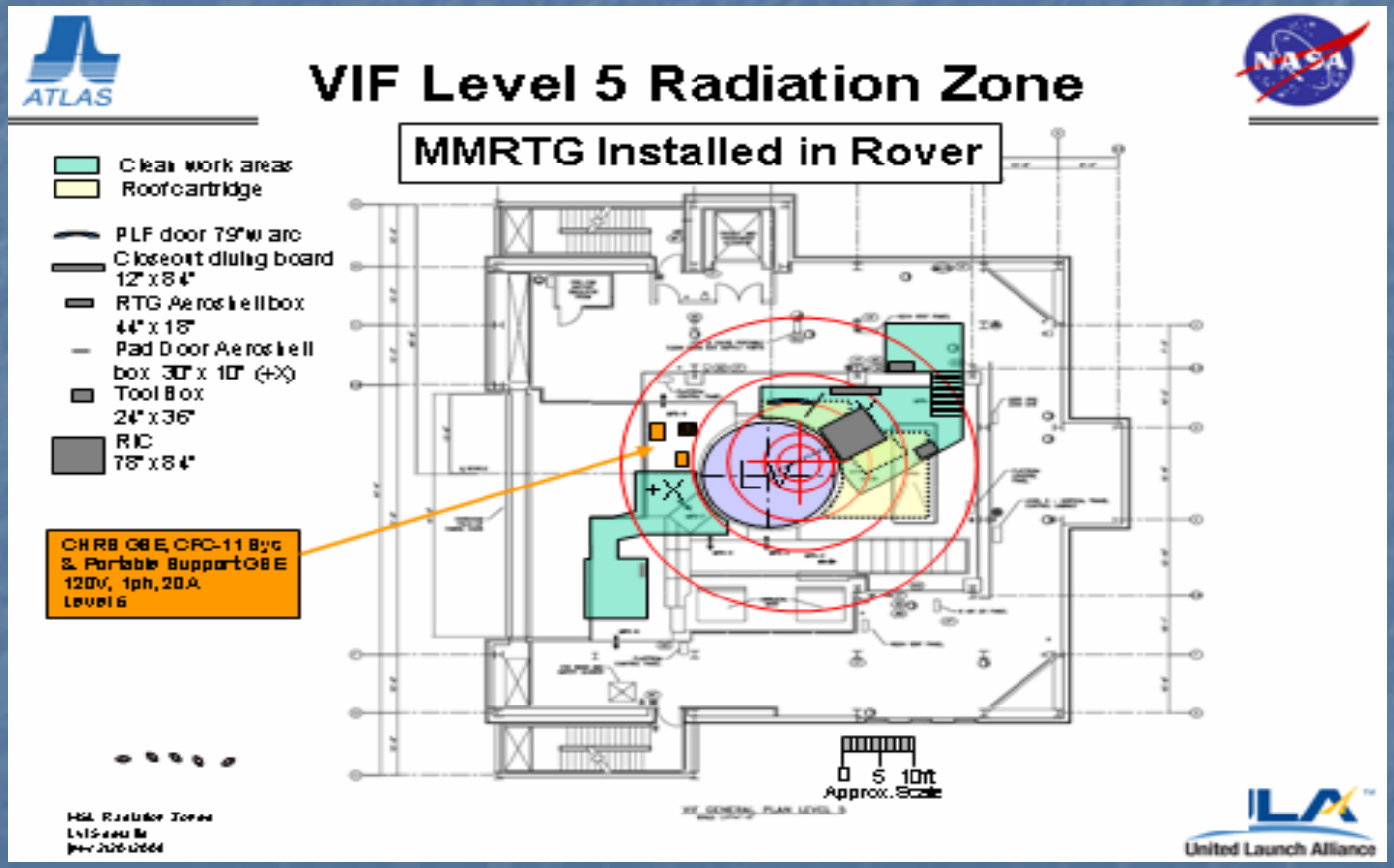


Figure 2.1-4. Cutaway View of a Step-2 GPHS Module

VIF RADIATION ZONES



Go For Launch

MSL Landing Sequence